User Manual

BM 25

Transportable Multi Gas Monitor

Part Number: NPB25EN
Version: K.1

OLDHAM
The Fixed Gas Detection Experts

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The information contained in this manual is accurate to our knowledge.

As a result of continuous research and development, the specifications of this product may be modified at any time without prior notice.

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Thank you for choosing this OLDHAM instrument.

All of the necessary actions have been taken in order to ensure your complete satisfaction with this equipment.

It is important that you read this entire manual carefully and thoroughly.

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- Under normal conditions of use and on return to the factory, parts and workmanship are guaranteed for 2 years, excluding such consumables as sensors, filters, etc).

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European Union (and EEA) only. This symbol indicates that, in conformity with directive DEEE (2002/96/CE) and according to local regulations, this product may not be discarded together with household waste.

It must be disposed of in a collection area that is set aside for this purpose, for example at a site that is officially designated for the recycling of electrical and electronic equipment (EEE) or a point of exchange for authorized products in the event of the acquisition of a new product of the same type as before.

Chapter 1 | Introduction

General information

The *BM 25* is a portable gas monitor that can be used in explosive gas atmospheres according to the ATEX 94/9/EC directive and the IECEx international certification system**.**

It provides simultaneous detection of up to five gases present in the air by means of sensors specific to each risk to be evaluated (under-oxygenation, explosive or toxic gases).

Figure 1: view of the monitor.

Overall view of the monitor

Figure 2: the monitor features.

Ref.	Description	See page
1.	Transport handle.	
2.	360° visual alarm (general indicator for gas alarms, transferred alarms and faults). ■ Gas alarm 1: slow blinking (1 Hz). ■ Gas alarm 2: rapid blinking (2 Hz). ■ Transferred alarm: very slow blinking (0.5 Hz). ■ Fault: continuously lit signal.	9, 29
3.	Speakers for audible alarm. ■ Gas alarm 1: two-tone, slow (1 Hz). ■ Gas alarm 2: two-tone, rapid (2 Hz). ■ Transferred alarm: two-tone, very slow (0.5 Hz). ■ Fault: mono-tone, continuous (0 Hz).	15, 29
4.	Local charger connection (red ring).	15, 17
5.	Trickle charging device connection (black ring)	15, 18
6.	Acknowledge button for alarms and vertical menu navigation (*).	-
7.	Control button for display back-lighting (screen automatically turns off after 4 minutes) and horizontal menu navigation (*).	-
8.	On/Off or Enter button (*).	25
9.	LCD digital display (measurements, menus).	14
10.	Sensor cells.	13
11.	Infrared communication connection.	53
12.	Alarm transfer connection (black ring).	53
13.	Logic input connection (yellow ring).	31
14.	Brief instructions for use and manufacturer's plate.	

(*) Push buttons are "piezo" type with slight deformation.

Connections

Local charger connection (red ring)

- Connection: to *Oldham* universal charger (110/220 VAC) or vehicle charger (12/30 VDC).
- Prong 1: V- charge.
- Prong 4: V+ charge.

Connection prohibited in ATEZ zones.

Unused connectors must be equipped with their protective cap.

See connection in detail on page 17.

Figure 3: local charger connection.

Trickle charging connection (black ring)

- Connection: to the trickle charging intrinsic safety device.
- Prong 1: V+ trickle charge.
- Prong 2: V- trickle charge.
- Prong 3: V+ trickle charge.
- Prong 4: V- trickle charge.

Prongs 1-3 and 2-4 are connected in parallel.

Unused connectors must be equipped with their protective cap.

See connection in detail on page 18.

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Figure 4: trickle charge connector.

Alarm transfer connection (output - black ring).

- Prongs 1-6: static relay NO alarm contact.
- Prongs 3-4: static relay NO fault contact.

Unused connectors must be equipped with their protective cap.

See connection in detail on pages 20 and 21.

Figure 5: alarm connection.

Logic input connection (yellow ring)

- Prong 2: logic input for alarm transfer.
- Prong 5: logic input for alarm acknowledgement.
- Prong 7: ground logic input.

Unused connectors must be equipped with their protective cap.

See connection in detail on pages 20 and 21.

Figure 6: logic input connection.

Intrinsic safety settings

- Alarm contact: static relay, Ui = 30 V, Ii = 150 mA, no L or C condition.
- Power supply for trickle charging: Ui = 30 V, Ii = 160 mA, no L or C condition.
- Logic input: Uo = 5 V, Io = 50 mA, Lo = 8 mH, Co = 7 µF.

The person responsible for the gas monitor must create a system log (intrinsic safety installation).

Additional equipment

Figure 7: the gas monitor accessories.

Ref.	Description	See page
1.	Cover for the integrated automatic sampling system (*).	22
2.	Cover for the manual sampling system or calibration.	22
3.	Trickle charge connection for intrinsic safety (provided with wires).	18
4.	Flexible tube and connection for manual or automatic sampling system or calibration.	22
5.	PC-monitor infrared connection.	53
6.	Universal charger 110/220 VAC.	17
7.	Cable for trickle charge connection (ref. 3).	18
8.	Cable for alarm transfer (25, 50 or 100 meters).	20, 31

(*) Optional

Measurement sensors

The sensors are visible on the front of the monitor (Figure 2, ref. 10).

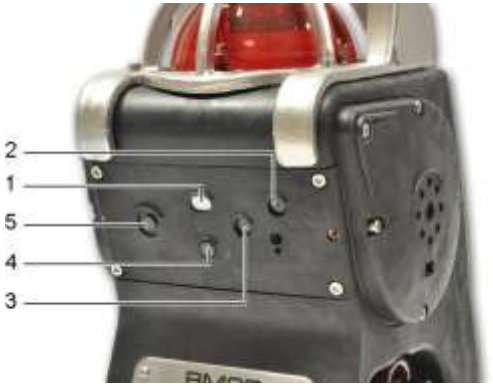


Figure 8: sensors in detail (example configuration).

Ref.	Description
1.	Explosive gas sensor from 0 to 100% LEL or catharometric sensor from 0 to 100% vol CH_4.
2.	Mini toxic sensors or mini O_2 sensors (lifetime 1 year).
3.	Mini toxic sensors or mini O2 sensors (lifetime 1 year).
4.	Medium sensors: ■ O_2 (lifetime 2 years). ■ CO/H_2S, SO_2, ETO, etc. ■ CO2 IR.
5.	Sensors S7/S3: ■ SO_2, ETO, etc. ■ IR infrared sensor for combustible gas detection. ■ PID sensor for VOC detection (volatile organic compounds). ■ O_2 sensor (lifetime 2 years).

The removable, interchangeable and intelligent sensors are positioned as indicated in the following table. They are composed of a sensor element and electrical components, including an EEPROM memory in which the sensor characteristics are stored (range of measurement, various correction coefficients, STEL and TWA alarms, date of manufacture, serial number, date of most recent calibration, wear rate, etc.) The wear rate is updated after each calibration and allows the user to gage the optimal time for changing the sensor.

Notes:

- “Big sensors” are 3 or 7 series format.
  Example: compensated butane or hydrogen CO sensor (CO/H_2 or CO/HC).
- If sensors are present in slots 2 and 5, the sensor in slot 5 has priority and deactivates the one in slot 2.
- The “combo” CO/H_2S sensor can only be plugged in position no. 4.
- The PID sensor can only be used in location no. 5.

Sensor slots and protection filters must be kept clean. Otherwise, gas concentration measurements could be affected.

Display screen

The display is graphic LCD and (Figure 2, ref. 9) backlighting is automatically activated in the case of an alarm or fault. It can be rotated 180° using *COM2100*.

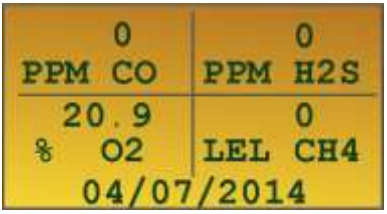


Figure 9: display and examples of the viewable information.

The following information is displayed:

- 5 concentration measurements with the name of the gas and unit.
- A channel calibration reminder.
- The date and time.
- The minimum and maximum values measured.
- The average STEL (short-term exposure limit) and TWA (time-weighted average) values.
- The remaining battery life (bargraph).
- Operator identification (roundsman function).
- Maintenance menus.
- Alarm transfers.

Visual alarm

Indicator light (Figure 2, ref. 2), located on the top of the device, alerts the user in the case of alarm or fault.

Audible alarm

Two powerful integrated speakers (103 dB at one meter), located on the sides of the gas monitor (Figure 2, ref. 3) alert the user in the case of alarm or fault.

Sampling system

The gas monitor can be used in *Diffusion* mode, or can be equipped with an integrated electric pump or an external manual aspirator for atmospheric controls in areas with low accessibility or prior to entry. In the two latter cases, a cover for the sampling system (Figure 7, ref. 1 or 2) xxx must be placed on the monitor.

Electrical charging and internal batteries

Vehicle recharging (12 to 30 VDC) or 110/220 VAC adapter recharging.

The battery is charged through a dedicated connector on the left side of the monitor (Figure 2, ref. 4). The maximum charging time is 4.5 hours.

Trickle charge connector

The intrinsic safety trickle charge connector (Figure 10) provides a power supply for the monitor when it is located in explosive zones, through a dedicated connector on the left side of the monitor (Figure 2, ref. 5). In this configuration, the internal battery is charged very slowly. The current supplied through the trickle charge connector is used mostly to power the electrical circuits.

Figure 10: 110/220 VAC adapter (right image) and the optional trickle charge connector (left image).

Memory storage battery

A non-rechargeable lithium battery provides power for data storage (timestamps, history), when the gas monitor does not have power. The maximum battery life for this battery is 2 years in the absence of a primary power source (battery not charged or gas monitor switched off).

Chapter 2 | Installation and connections

Power supply

General Information

Power is supplied to the gas monitor through an interchangeable and rechargeable battery pack (NiMH 7.2 V / 9 Ah rechargeable pack). Under normal usage conditions and no radio communication, the battery life ranges from 40 to 170 hours depending on the configuration (100 hours under standard configuration: diffusion model equipped with 1 explosive gas sensor and 2 electrochemical toxic gas sensors). For the wireless version, the battery life ranges from 35 to 135 hours (65 hours under standard configuration).

The gas monitor is approved for explosive atmosphere operations only when it is equipped with the battery pack type recommended by the manufacturer. When changing the battery pack, always switch the device off first.

Charging the battery pack

A connector (Figure 2, ref. 4) allows for the battery pack to be recharged without dismantling:

- A continuous power supply of 12 to 30 Volts compatible for vehicle use.
- A 110 VAC / 220 VAC power adapter.

Battery pack charging time is 4.5 hours.

Insert the cable connector (Figure 11, ref. 1) from the vehicle or mains power pack (Figure 11, ref. 3) into the corresponding port (Figure 11, ref. 2) on the device. Connect the other end of the power supply (Figure 11, ref. 4) to the power source.

Charging the gas monitor through the connector (Figure 2, ref. 4) must not be done in hazardous zones.

Figure 11: charging in safe zones.

Trickle charging in hazardous zones

A second connector (Figure 2, ref. 5) can be used to keep the gas monitor's charge level constant (except in alarm conditions) for as long as needed using an intrinsically safe power supply. Through the use of one or two intrinsically safe power supplies (single or double kits), the gas monitor can continue to operate in explosive zones.

Technical characteristics of the intrinsically safe power supply for trickle charge:

- Io ≤ 160 mA.
- Pmax= 1.2 W.
- Maximum cable resistance = 16 ohm, based on a maximum cable length of 500 meters at 1.5 mm².

The 25, 50 and 100 meter trickle charging kits are single or double for gas monitors equipped with an explosive gas and infrared sensor. Only the power supply provided by OLDHAM can be used.

Insert the cable connector (Figure 12, ref. 6) from the trickle charging connector (Figure 12, ref. 1 and 3) into the corresponding port (Figure 12, ref. 4) on the gas monitor. Connect the other end of the power supply (Figure 12, ref. 2) to the mains and only in areas known to be safe.

The trickle charge connector (Figure 12, ref. 1) must be located in a nonhazardous zone. The gas monitor however, may be located in a hazardous zone.

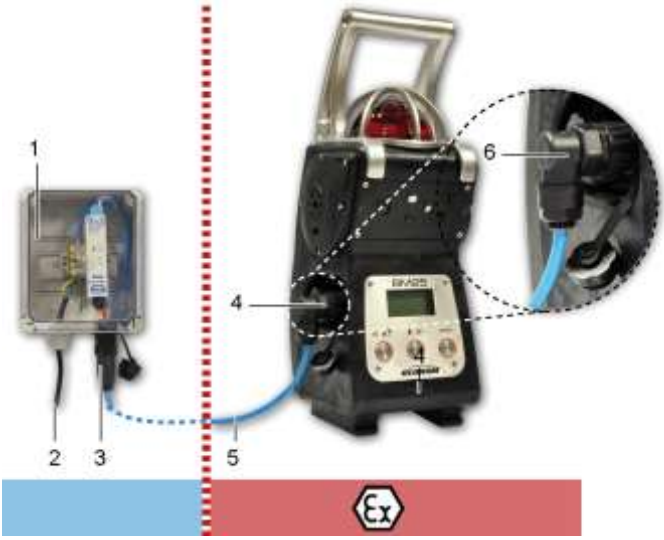


Figure 12: the trickle charge cable connects to the dedicated port on the device (left side, port with a black ring).

Additional ports

Straight-forward alarm transfer

Refer to the *Connections* paragraph on page 10, for connecting the logic input or the alarm transfer.

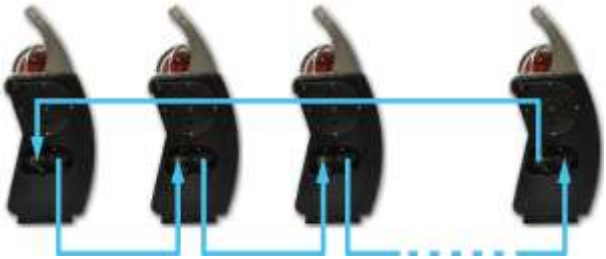


Figure 13: example of alarm transfer in sequence.

Manual call point button connection

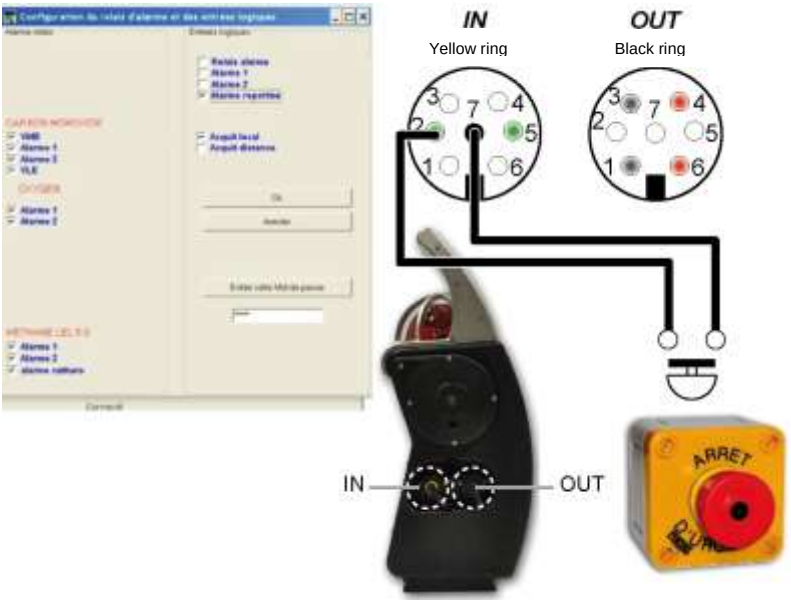


Figure 14: example of a manual call point button connection on the device. Refer to the chapter on *COM 2100 software*, on page 53, for the settings.

Connection between two gas monitors

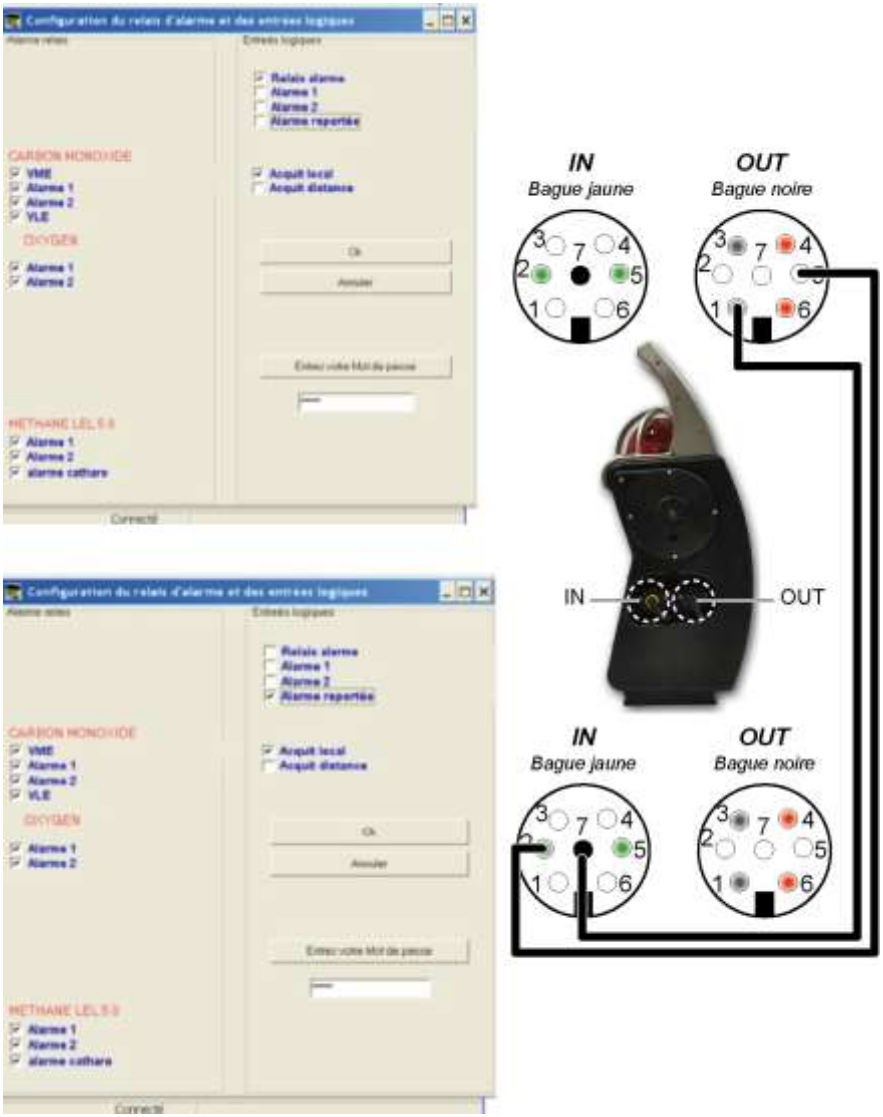


Figure 15: example of a connection between two gas monitors. Refer to the chapter on *COM 2100 software*, on page 53, for the settings.

Gas monitor positioning

The gas monitor is placed vertically. Its positioning and/or the sampling area should take into account the density of the gases and the airflow.

Sampling in natural diffusion mode

Using this configuration, the gas monitor is used without an additional sampling device; the measurement sensors monitor the ambient atmosphere. Continued on page 25.

Sampling in forced diffusion mode

In this configuration, the gas monitor is equipped with an integrated electric pump or a manual aspirator (external). Sampling in forced diffusion mode is used for atmospheric monitoring in areas with low accessibility, or prior to entering a potentially hazardous or confirmed hazardous zone.

Sampling probes (rigid, semi-rigid or telescopic), flexible probes, horn bulbs and certain rods are not antistatic. The user must take the necessary precautions to avoid electrostatic discharges. In all cases, the user must prevent dangerous electrostatic discharges using a metallic probe.

Using an electric pump

- The internal pump is powered by the gas monitor's battery and starts automatically when the gas injection cover is applied (Figure 16, ref. 1); this cover can be identified by its boss (Figure 16, ref. 4).
- Connect the sampling tube equipped with a clip (Figure 16, ref. 2) to the pneumatic connector (Figure 16, ref. 3).
- Wait a few seconds before reading the measurements. Any anomaly in the pump system is indicated by an audible alarm and on the display unit.

Before each use of the electrical pump, check the seal by obstructing the end of the sampling line until the draining alarm is triggered. Do not forget to remove the cover to return to diffusion mode.

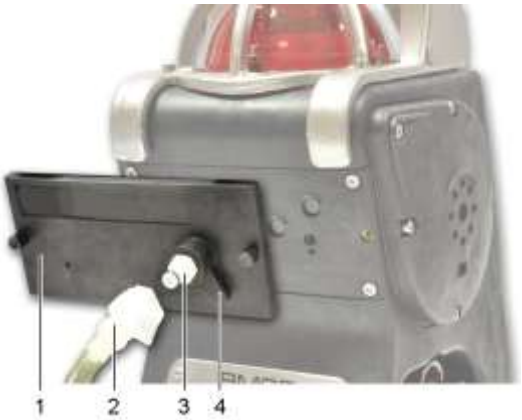


Figure 16: positioning the cover for use with electric pump.

Using a manual pump

Figure 17: placing the cover for use with manual aspirator (manual pumping).

- Place the cover with pipe attached (Figure 17, ref. 1 and 2); this cover does not have a boss as indicated (Figure 17, ref. 4 compare to Figure 16, ref. 4).
- Connect the sampling tube equipped with a clip (Figure 17, ref. 2) to the pneumatic connector (Figure 17, ref. 3).

- Wait for the measurements to stabilize before recording them; if measurements are recorded too soon, they may be over-estimated (explosive gases), or under-estimated (oxygen) during the manual pumping using the aspirator, due to airflow and system draining.

Once the sampling is complete, remember to take off the cover to return to diffusion mode.

Chapter 3 | Use

Start-up

When starting up the gas monitor for the first time or after a period of inactivity longer than one month, the monitor must be charged and the battery drained. Additionally, keep in mind that all portable gas monitors must be tested with gas before every use.

During gas monitor start up, the user may choose one of two procedures:

- Standard procedure, used in most cases. See paragraph *Standard Start-up* on page 25.
- A procedure allowing you to select a reference explosive gas. This procedure is useful when checking for a specific gas (propane, butane, etc.). See paragraph *Start-up with choice of reference explosive gas*, on page 26.

Starting up in standard mode

- Press the *Enter* button (ref. 1).
- Before displaying current measurements, the gas monitor performs visual and auditory tests, which take a few seconds, and then displays:
  The OLDHAM logo,
  The on-board software version and the device's serial number,
  The alarm thresholds set for each measurement channel.
- Continue to paragraph *Start-up test and calibration due*, on page 26.

Note: once the monitor is started, there will be a flash to indicate to the user that it is operating correctly. This correct operation flash can be canceled and the frequency can be changed using the *COM 2100* software; see page 53.

Figure 18: start-up in standard mode by pressing the *Enter* button.

Starting up with choice of reference explosive gas

Step 1: turn on power supply

- While pressing the *Quit* button (ref. 1) switch on the instrument by pressing the *Enter* button (ref. 2).
- Release both buttons.
- After the testing phase, the list of pre-programmed gases will be displayed. The gas currently selected will be highlighted.

Figure 19: starting up with choice of reference gas

Step 2: selecting the reference gas

- Use the button (ref. 1) to see the list of gases. Thirty-one (31) reference gases are available in the library. Choose *Other* to select a gas for your specific needs. The data for this gas will be entered in the workshop.
  Note: if a gas is not selected in the allotted time, the monitor will start in normal mode without changing the reference gas.
- Press the *Enter* button (Figure 19, ref. 2) to confirm the choice of gas.
- When beginning a new testing phase, the explosive gas selected will be the reference gas.
- Continue to paragraph *Start-up test and calibration alert*, below .

Start-up test and calibration alert

During start-up the gas monitor will perform a self-test and then begin measurement mode if the test is successful. Otherwise, the monitor will go into fault mode (continuous auditory and visual signal). The display will indicate *Calibration alert*.

If the calibrating date for a sensor has passed, the *BM 25* will trigger a calibration alert for the appropriate channel; this may be dismissed if the gas monitor is still in use, but it must be calibrated.

Measurements

Reading measurements

The gas levels measured by each sensor are viewable on the display in four separate fields. In each field, the measurement is displayed as follows:

- Measurement of the concentration.
- Unit of measurement.
- Gas symbol.
- In "5 gas" configuration, channel number 5 is displayed alternately with channel number 3 in the bottom left-hand quarter.

At the bottom of the screen, the time, alarm status and if necessary, wireless communication status are displayed (see page 35).

Figure 20: display indications for a gas monitor not equipped with a wireless connection (left image) and for a gas monitor equipped with a wireless connection (right image).

When equipped with an *Explosimetric (% LEL) / Catharometric (% vol)* sensor and with an oxygen sensor (mandatory in this case), the gas monitor switches automatically from the *0-100% LEL range* to the *0-100% Gas range* when the measurement is above 100% LEL of the selected reference gas. The letter *K* shown on the display confirms this mode.

Explosive gas concentration measurements can be affected by high or low oxygen concentrations. Any reading rapidly changing from too high (exceeding 100% LEL) to too low can in fact indicate a hazardous gas level higher than the measurement scale.

Display management

Display backlighting

Measurements can be read in insufficiently lit areas by pressing the button. This lighting is automatically deactivated after 4 minutes. The display unit backlighting is automatically activated in case of an alarm or fault.

Displaying additional information

When the gas monitor is in normal operating mode, the user can access various information on gas concentration measurements or certain internal data (battery life remaining, date and time). Press the button repeatedly to scroll to see the following settings:

- Display unit backlighting and date.
- Measurement location and user name (only when the *Roundsman* option is activated; see paragraph *Roundsman function*, below).
- Remaining battery life (bargraph).
- Indication of minimums detected by each sensor.
- Indication of maximums detected by each sensor.
- STEL of each *toxic* channel.
- TWA of each *toxic* channel.
- The message *Enter the maintenance code* for accessing the maintenance menus. To access this menu, enter the 4-digit code using the and buttons.

Press the button to return to normal operation.

Roundsman function

If the instrument is equipped with the *Roundsman* function, a list of names can be pre-programmed using the *COM 2100* software. This list can be consulted manually using the buttons on the device.

To change the name or location, follow these steps:

- Press the button repeatedly until *Current location/ name* appears.
- Press *Enter*.
- Scroll through the pre-programmed list using the and buttons.
- Press *Enter* to select and confirm the new name.
- Press to return to normal mode.

Re-initialization of Min/Max

Pressing the and buttons together will initialize the min/max values. An audible beep confirms the action.

Alarms

The gas monitor is equipped with visual and auditory indicators:

- Visual alarms: plain text messages on the display, a 360° red light visible from all directions
- Audible alarms: two powerful speakers (103 dB @ 1m.)

Gas alarms

The gas monitor includes:

- Two instantaneous thresholds per channel for explosive, toxic or oxygen sensors.
- High and low thresholds on the oxygen channel (2 optional low thresholds).
- An instant threshold on the catharometric channel.
- A STEL threshold *(Exposure Limit)* corresponding to a sliding average of measurements over 15 minutes (depending on the country) for each channel equipped with a toxic gas sensor.
- A TWA threshold *(Average exposure*) corresponding to a sliding average of measurements over 8 hours for each channel equipped with a toxic gas sensor.

When an alarm is triggered, the monitor's auditory and visual signals will turn on with a frequency depending on the type of alarm triggered;

- Gas alarm 1: two-tone, slow (1 Hz).
- Gas alarm 2: two-tone, rapid (2 Hz).
- Transferred alarm: two-tone, very slow (0.5 Hz).
- Fault: mono-tone, continuous.

The display will show the alarm message(s) (ALARM 1, ALARM 2, AL. TRANSFER, STEL, TWA, mini, etc.) as well as the measured value. In alarm mode, the monitor will display the maximum value measured continuously (or minimum value, in the case of a decreasing alarm), until the message is dismissed by pressing the button.

Alarm information has priority over fault information.

Acknowledging gas alarms

Manually acknowledging gas alarms

The auditory alarm will stop when the button is pressed. The visual alarm light will continue to blink while the gas measurement is outside the set limits. The visual alarm will turn off automatically when the measurement is within the set limits.

If after two minutes the gas level is still outside the set limits, the auditory alarm will automatically reactivate; this function can be deactivated by factory settings.

Automatically acknowledging gas alarms
Gas alarms can be programmed to acknowledge automatically. In this configuration, auditory and visual alarms will acknowledge automatically, without any action, as long as the gas measurement is within the set limits.

***Fault* alarms**

Faults can be classified into two categories:

- Sensor faults: outside range, worn sensors, zero deviation, etc.
- Monitor faults (battery depleted, wireless communication fault, electronics fault, etc.).

In the event of a fault, the monitor will trigger a continuous auditory and visual signal. The corresponding fault message appears at the bottom of the display.

Examples of information which may be brought to the user's attention

Battery fault
- Low battery: battery life remaining is less than 20 minutes. The gas monitor is still operational, the fault auditory alarm can be dismissed.
- Battery fault: detection is no longer assured. The auditory alarm is not acknowledgeable.

> 100% LEL: outside range in explosive channel
This concerns only the explosive channel and if there is no catharometric sensor (0 to 100% gas volume). In this case:

- The display for the channel concerned is frozen.
- The continuous auditory signal cannot be dismissed.
- The general alarm indicator lights are lit continuously.
- Power to the explosive sensor is cut off (LEL) in order to prevent overexposure to gas.

Normal operating conditions can be restored by stopping and restarting the gas monitor; this operation must be performed outside the hazardous area.

Out of range
- Negative fault (reading below -20% of the scale). The fault is acknowledged automatically.
- Positive fault (scale exceeded by 120%). The fault must be acknowledged manually.

Alarm transfer

The gas monitor is equipped with:

- A *Gas* alarm relay shared by all channels and dedicated to alarm transfers.
- An *AON* (All or Nothing) logic input dedicated to triggering the local alarm.

By connecting the alarm transfer cable (ref. 2), from the output of one gas monitor (ref. 1) to the input (ref. 3) of another, and so on, it is possible to transfer alarms from one gas monitor to another. This configuration is used particularly in zone monitoring. For example, it may be used for monitoring a closed space, by connecting monitors in a line or by creating a perimeter of loop-connected monitors.

The input and output can be configured using the *COM 2100* software; see page 53.

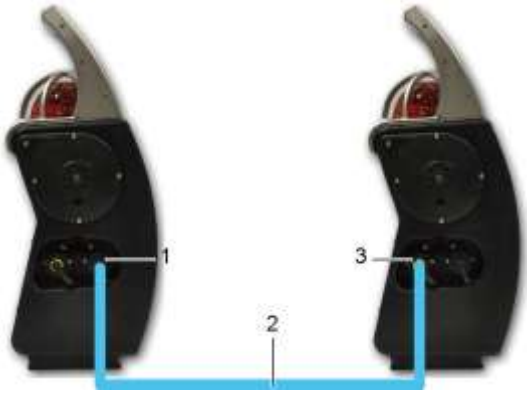


Figure 21: inter-monitor connection.

Mandatory parameters for inputs/outputs:

- Voltages and alternating currents: I = 150 mA max. - U = 30 V max.
- Voltages and direct currents: I = 150 mA max. - U = 30 V max.

If the gas monitor is used in an explosive atmosphere, it is imperative to consider output relay parameters, since contact must not impair the intrinsic safety of the gas monitor. These parameters are mentioned in the paragraph *Special Instructions for use in ATEX zones* on page 75. OLDHAM shall not, in any event, be liable for failure to follow regulations.

Data transfer

The monitor stores measurements and alarm or fault events in the memory, and this data can later be transferred to a computer. The *Histogram* memory can only be erased using a Windows® PC. Switching off the gas monitor has no effect on stored data.

Stored data

Once turned on, the monitor records data in time-stamped frames. The monitor begins a new frame every time it starts up and every 24 hours. A frame contains:

- Information on measurement channels.
- The average concentrations for each sensor in operation over the storage interval (configurable).
- The events of each channel with date and time:
  - Acknowledgment.
  - Faults.
  - Instantaneous or average alarms.
  - Maintenance operations (programming, calibration, sensor changes, self-zero).

Memory capacity

The gas monitor can store approximately 200,000 measurement points. If the quantity of data to be stored exceeds the gas monitor's storage capacity, the oldest data are lost.

Data storage time

The data in the gas monitor memory are stored for two years if the gas monitor is no longer in service (turned off or dead battery).

Shut down

- To shut down the gas monitor, press the *Enter* button (ref. 1) located on the front plate, for 3 seconds.

  The monitor will display a countdown *Shut down, 3, 2, 1* before turning off.

  For newer models (released after January 2007), the user must release the *On-Off* button (ref. 1), then confirm shutdown by pressing the *Enter* button (ref. 1); follow the instructions on the screen.

Figure 22: shut-down by pressing *Enter* button.

Note: the configuration settings and recorded data (measurements, alarm events, calibration reminders, etc.) stay in the memory when the monitor is turned off.

Chapter 4 | WIRELESS VERSION

This product complies with FCC Maximum Permissible Exposure (MPE) requirements when used with an approved antenna and the antenna is at least 20cm away from the user. Use of the product closer than 20cm may exceed the MPE limits. Use of any antenna other than approved antennas will invalidate the certification of the product.

Overview

Available as an option, the radio communication allows several BM 25A to communicate on the same network (BM25 mode) or to send information wirelessly to a controller (CONTROLLER mode) such as the X40 from DETCON.

Wireless communication is made via a 2.4 GHz radio and emitted power is less than 100 mW. Maximum distance between two communicating devices is 3,300 feet line of sight. Up to 30 BM 25 can be meshed on the same network and up to 16 networks can coexist with no interference.

The network topology used by the BM 25A is a MESH network. In a mesh network all hosts are connected peer to peer without central hierarchy, thereby forming a net-like structure. Consequently, each node can receive, send and relay data. This avoids having sensitive points, which in case of failure, cut the connection of the network. If a node is down, its neighbors go through another route.

Mesh topology allows fast and simple deployment, high coverage versatility and high fault tolerance. It significantly reduces installation and operating costs of networks. These solutions reproduce the architecture of the Internet while optimizing for wireless.

Figure 23 : Wireless version, recognizable by the presence of an antenna.

BM25 Mode

When in BM25 mode, BM 25s send information regarding gas alarm and fault status. Once a BM 25 is in gas alarm, the alarm is repeated on all other BM 25s on the same network.

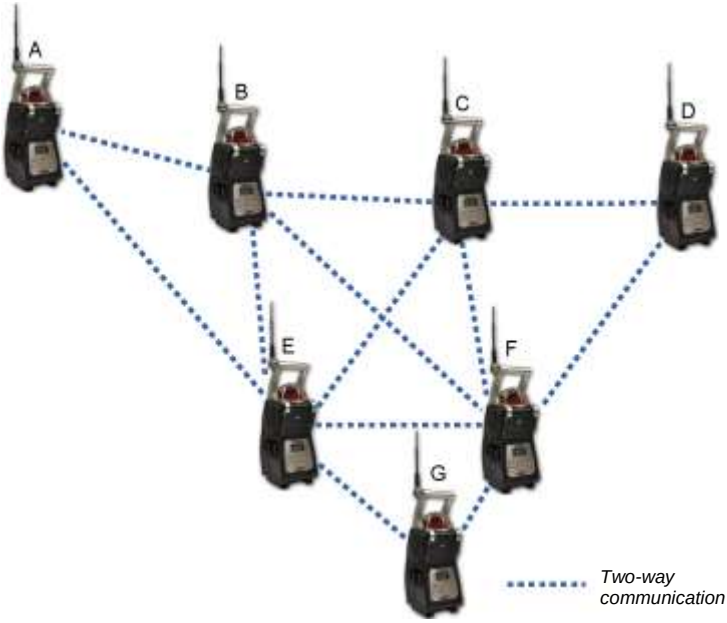


Figure 24 : In the example above, BM 25 tag G communicates with E and F. In the event of a loss of communication between G and F, E still ensures the communication to the rest of the network. If G goes into gas alarm or fault condition, all BM25 on the network will report a corresponding alarm.

Alarm sequence differs depending on whether a BM 25 sends information (gas alarm or fault) or receives information (alarm transfer). This allows for quick identification of the BM 25 in alarm condition so that the appropriate action can be taken. Although there is no hierarchy in a mesh network, the unit in alarm and the unit reporting the alarm are referred to later in the manual as 'main BM 25 and secondary BM 25, respectively.

		Main BM 25		Secondary BM 25	
Case	**Cause**	**Flash**	**Siren**	**Flash**	**Siren**
1.	Fault (no communication at all, sensor fault, low battery, etc.)	Steady	Yes	Steady	Yes
2.	At least one BM 25 does not communicate	Steady	No	Steady	No
3.	Alarm 1	1 Hz	1 Hz	0.5 Hz	0.5 Hz
4.	Alarm 2	2 Hz	2 Hz	0.5 Hz	0.5 Hz

Table 1 : 'Alarm' mode – Table of events

Gas alarm Transfer

In the event one BM 25 goes into a gas alarm, all secondary BM 25s will display « Al. Transfert » as shown below. Press the “acquit” button to silence the audible alarm. The BM 25 strobe will continue to flash until the alarm event has ended. The audible alarm will reactivate after 5 minutes if the alarm event is still active.

Note that if a second BM 25 had to fire a gas alarm, then this BM 25 would pass from ‘secondary’ to ‘main’ status and would sound at 1 or 2 Hz depending on the alarm level being reached. The secondary BM25s would not immediately reactivate the local siren.

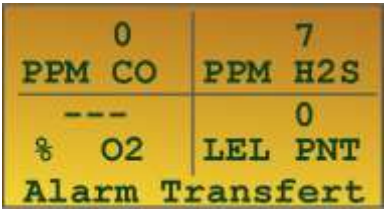


Figure 25 : Secondary BM 25 reporting an ‘Alarm Transfer’ condition.

Fault Transfert

In the event one BM 25 goes into fault condition, secondary BM 25s will display on their LCD screen the message « Def. Transfert » as shown below. This fault condition is not acknowledgeable and is automatically cleared as soon as the main BM 25 goes back into a normal operating condition.

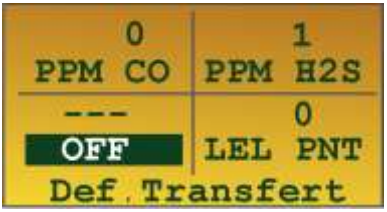


Figure 26 : Secondary BM 25 reporting a ‘Fault Transfer’ condition.

Controller Mode

In Controller mode, BM 25s send fault status, alarm status and gas measurements to the controller. As soon as one BM 25 fires an alarm, the controller relays the information to all BM 25s on the same network that then turn in Alarm Transfer mode.

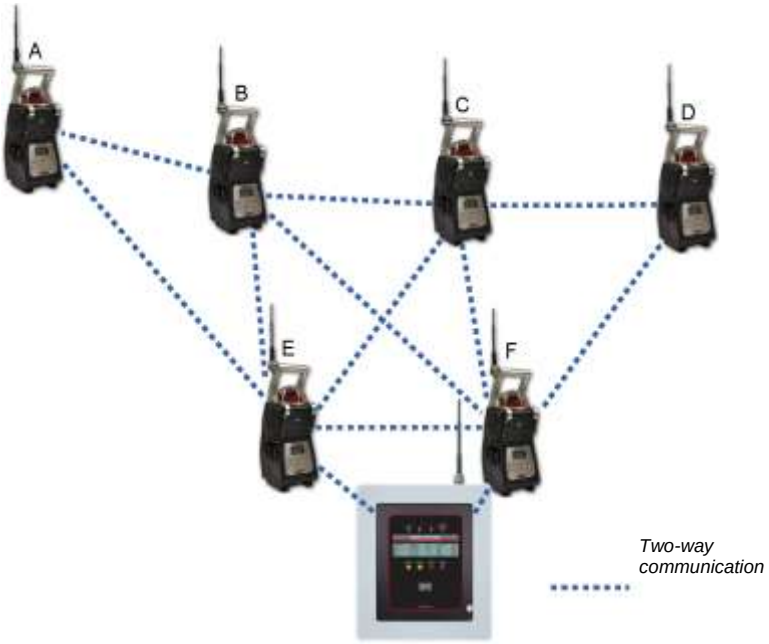


Figure 27 : In the example above, BM 25s E and F are the last links between the controller and the rest of the network. If communication between BM 25 F and MX 43 fails, then BM 25 E continues to provide communication between the BM 25 network and the controller. If BM 25 A goes into gas alarm or fault condition, then MX 43 receives information and passes it on all others BM25s.

The alarm sequence differs depending on whether a BM25 sends information (gas alarm or fault) or receives information (alarm transfer). This allows for quick identification of the BM25 that is in alarm so that appropriate action can be taken.

		Main BM 25		Secondary BM 25		Controller
Case	**Cause**	**Flash**	**Siren**	**Flash**	**Siren**	
1.	Fault (no communication at all, sensor fault, low battery, etc.)	Steady	Yes	Steady	No	
2.	At least one BM 25 does not communicate	Steady	No	Steady	No	
3.	Alarm 1	1 Hz	1 Hz	0.5 Hz	0.5 Hz	
4.	Alarm 2	2 Hz	2 Hz	0.5 Hz	0.5 Hz	

Tableau 2 : *Controller* Mode – Table of events

Start-up

From the Maintenance menu (see Chapter 5), choose Wireless. Leave it to 'OFF' if you do not want to activate the radio function. Select 'BM25' or 'Controller' according to the chosen operation mode (see above).

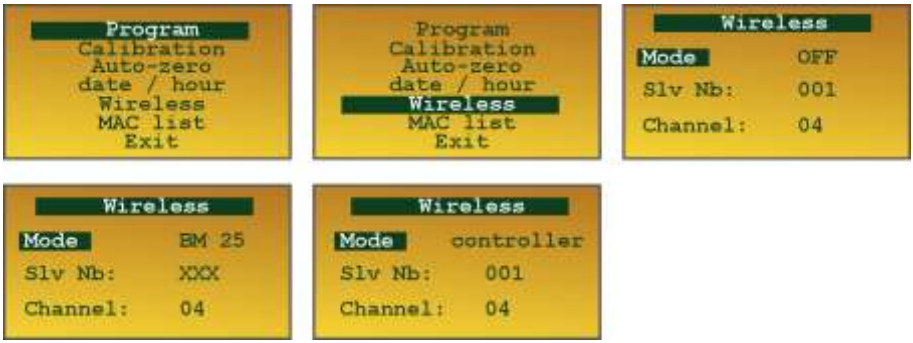


Figure 28 *: Wireless mode* screenshots.

- **In *BM25* mode**: only the network ID (Channel) must be set between 0 and 15. Address number (Slv Number) is not editable and is set to 'XXX'. In this mode, it is not necessary to assign an address as the network is automatically built in by using the MAC(*) addresses of each device.
- **En *Controller* mode**: set the BM 25 address *Slv Nb* between 1 and 30 max. and the network ID *Channel* between 0 and 15.

(*) MAC (Media Access Control): unique identifier assigned to network interfaces. Each BM 25 has its own unique MAC address.

WARNING

- It is important that all BM 25s intended to be on the same network have the same network ID.
- In Controller mode, two BM 25s cannot share the same address otherwise you will get a fault.

Once wireless mode is activated (‘BM25’ or ‘Controller’ mode), you have 5 minutes to declare another BM 25 on the same network. When the time is gone and no communication is established, BM 25 shows 'COMM ERR' and goes into fault (see case #1 from table of events).

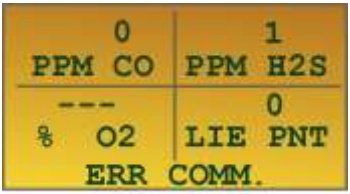


Figure 29 : *COMM ERR*, no communication is established.

Thereafter, in normal operation, each BM 25 sends its information over the network every ten seconds. If a BM 25 goes into gas alarm or fault condition, then the information is immediately sent without waiting ten seconds. In *BM25 mode*, the number of BM 25s that are communicating on the network is shown at the bottom of the display screen (example 4 shown below).

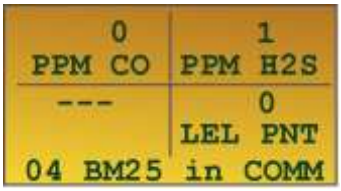


Figure 30a – BM25 mode : Four BM 25s communicate with each other on the same network.

Figure 30b – Controller mode : BM 25 is communicating with the controller.

When in *BM25 mode*, BM 25 displays the radio signal strength as indicated below in figure 30c. It corresponds to the average of signals received from all BM 25s that the BM 25 you are looking at is communicating with.

Figure 30c – BM25 mode : Radio Signal Strengh

When ▪▪▪▪▪ is displayed, the BM 25 has 100% of the signal and the radio communication is very good.

When ▪_____ is displayed, the signal strengh is less than 20% although BM 25s are still communicating.

When _____ is displayed, no communication is established, BM 25 shows 'COMM ERR' and goes into fault (see case #1 from table of events).

Adding a BM 25 on an existing network

In BM25 mode, the network is automatically built. Each BM 25 with the same network ID is automatically included as long as it communicates with at least one BM 25 belonging to the same network.

To add a new BM 25 to an existing network, simply turn the unit on, activate the radio communication and, if applicable, set the network ID.

In MODBUS mode, you must set the address number (Slv Nb), set the network ID (Channel) and configure, if applicable, a new input on the controller.

Removing a BM 25 from an existing

In *BM25* mode

- turn the unit off
- or deactivate the radio module from the maintenance menu.

In both cases, before communication stops, the BM 25 broadcasts a last message to inform the other BM 25s on the same network that it will be removed.

In Controller mode

To remove a BM 25 from an existing network, just switch the controller channel off, then turn the BM 25 off or deactivate the radio module if you still need to use the BM 25 in local.

Self-healing

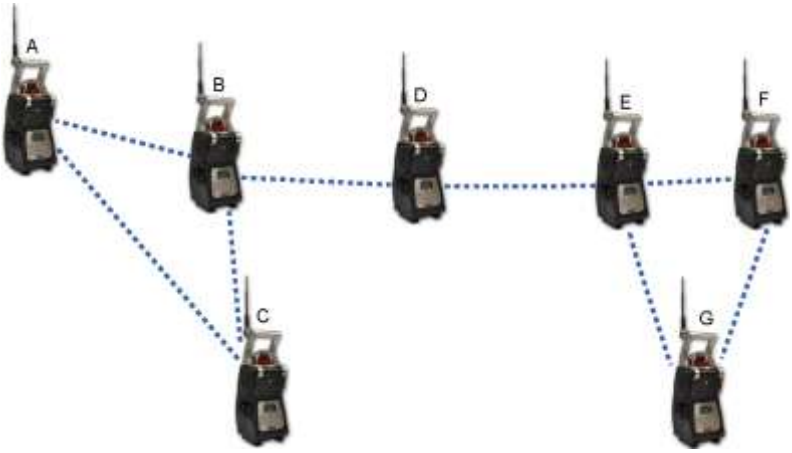
NOTE : This section covers the '*BM25*' mode only.

Each BM 25 broadcasts a message every 10 seconds. Using the example shown below, if BM 25 tag A receives no message from BM 25 tag B for more than 2 minutes, then B is considered as missing by A which turns into fault mode (case No. 2 – Table of alarms) and transfers the information to all other BM 25s on the network. Note that BM 25 tag B can act the same if it receives no information from A. Number of BM 25s that do not communicate anymore is displayed on each BM 25 referring a communication fault. This number may differ depending on the BM 25 you are looking. Here below, one BM 25 out of four is no longer communicating.

Figure 31 : One BM 25 out of four does not communicate.

In case of communication failure, the network tries to reestablish communication every ten seconds.

In BM25 mode, if a BM 25 does not respond or if the network is split, then it is possible to ignore this fault and to continue to work by the time of the restoration of the network.



In the example above, BM 25 (unit D) is the only communication link between A, B, C and E, F, G. If BM 25 (unit D) had a fault (low battery for instance) or if an obstacle were to disrupt communication between D and E or D and B, then all BM 25s would report a fault failure (steady flashlight according to case No. 2 – see table of alarms).

IMPORTANT :

- Note that the gas detection remains effective and that BM 25 (unit D) would still locally alarm in the presence of gas. It is the same for each BM 25 on the network. Only the alarm would not be transferred to the whole network.
- To ensure maximum network reliability, a BM25 should always communicate with at least two neighbors.

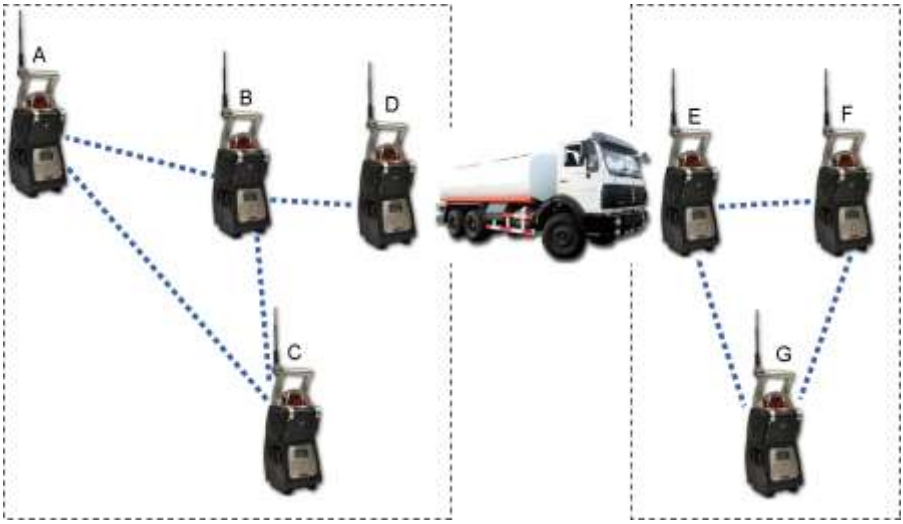


Figure 32 : group concept (read details below).

A long press on the « acquit » button forces the system to a new identification of the nodes present on the network. BM 25s that do no communicate are ignored without triggering a fault condition. In the example above, the communication between D and E is down. A long press on the « acquit » button of BM 25 (unit D) resets the network. All BM 25s communicating with D automatically launch a new identification in turn. On one side, BM25s A, B, C and D discover each other and form a first group. On the other side, BM25s E, F and G still report a communication failure since they do not receive data from the BM25s of the newly formed group. A long press on the « acquit » button of one BM 25 (unit E, F or G) clears the list of BM25s on the network and forces to a new identification. Similarly as above, BM25s (units E, F and G) form a second group.

IMPORTANT :

- The two groups run independently and alarm or failure events from one group cannot be transferred to the other group.
- When the obstacle (the truck in our example) is gone, the communication between E and D resumes automatically without the need to restart identification. The two groups merge together to form only one group.

To start a new identification, keep pressing the « acquit » button for 3 seconds. The display successively shows 3, 2, 1 then « confirm ». Release the « acquit » button and press again.

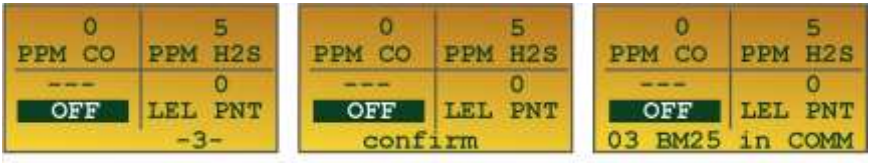


Figure 33 : reset sequence of a group of BM 25s.

NOTE :

- When a new identification has started, communication errors are inhibited for one minute.
- Once the network healing is completed, it is possible that one or several BM 25s remain isolated and stay in fault mode (case No. 1 – Table of alarms). To acknowledge this failure, turn the unit off or disable the radio communication from the maintenance menu.

Adding a new BM25 to the network at a smart location overcomes the obstacle and restores the communication between the two groups which then merge together. This healing is automatic as long as BM 25 (unit H) belongs to the same network (same 'Channel' ID).

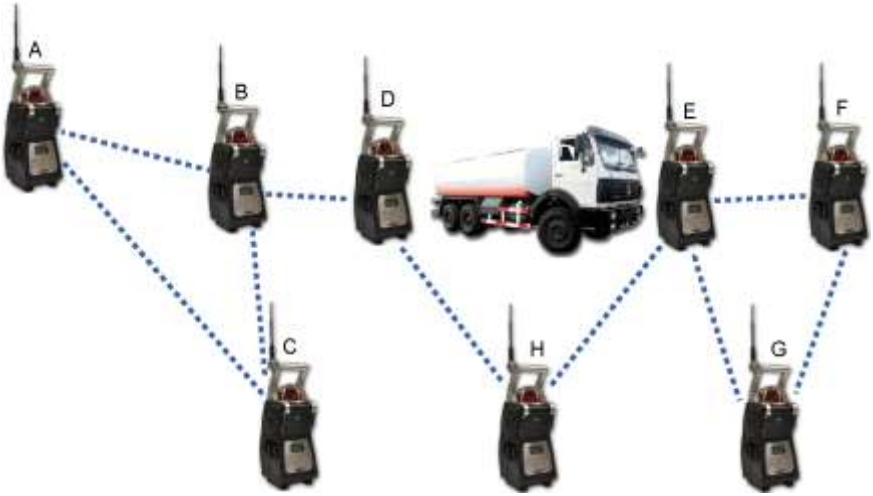


Figure 34 : bypassing an obstacle by adding a new BM 25 (H).

Mac list menu

NOTE : This section covers the 'BM25' mode only.

Available from the Maintenance menu (see Chapter V), the « MAC List » menu allows the user from any BM 25 belonging to the network to get the MAC(*) address of each BM 25 on the network and its particular status.

(*) MAC (Media Access Control): unique identifier assigned to network interfaces. Each BM 25 has its own unique MAC address.

Figure 35 : MAC List menu.

When in the « MAC List » menu, the first address displayed and aligned to the right is the address of the BM 25 you are currently looking at (here 0487D2). Up to 6 MAC addresses can be displayed per page.

Figure 36 : List of the MAC addresses present on the network.

A BM 25 in gas alarm mode is shown with the status ‘A’ (here, BM 25 with address No. 04C392 is in alarm). A BM 25 in fault mode (low battery for instance) is shown with the status ‘D’ (here, BM 25 with address No. 0487D1 is in fault).

Figure 37 : Status of each BM 25 on the network.

When a BM 25 is no longer communicating on the network, its address appears in reverse video. See “SELF-HEALING” parapragh for trouble shooting.

Figure 38 : BM 25 with MAC address No. 0487D1 does not communicate.

Chapter 5 | Maintenance

Gas monitors are above all safety instruments. Recognizing this fact, OLDHAM recommends that a functional test be performed on every portable gas monitor prior to each use. A functional test involves injecting a gas of sufficient concentration at the sensor level to trigger pre-set alarms. This test does not, in any event, replace a full calibration of the sensors.

If a gas monitor does not respond correctly to a gas test, a full calibration with a standard gas is mandatory.

These recommendations are consistent with applicable industry safety protocols and with the standards and directives relative to the safety of industrial sites. OLDHAM is also not responsible for procedures performed onsite.

The gas monitor is factory-programmed to display a maintenance alert automatically if calibration has not been performed in the last twelve months (the message *Calibration due* will appear on the screen).

The operations explained in this chapter must be performed by authorized, qualified personnel only, as they could adversely affect detection safety.

Accessing maintenance menus

When the monitor is in operation, menus can be accessed in the following manner:

- Scroll to parameters using the button until a request for an access code is displayed: *0018* is the standard code.
- Scroll to each digit with the button, choose the number with the button and confirm access code with the *ENTER* button.

The list of available menus will then be displayed:

- Programming.
- Calibration.
- Auto-adjustment.
- Date / time.
- Wireless (see *Chapter 4 – Wireless model*).
- MAC List (see *Chapter 4 – Wireless model*).
- Exit.

Programming Menu

This is used to:

- Select the channel to be programmed.
- Switch the selected channel On or Off.
- Inform the operator of the type of sensor and measurement range.
- In the case of an explosive, catalytic *Wheatstone Bridge* sensor, to select the type of reference gas from 31 pre-selected gases (see table below) or enter the coefficient of a 32nd gas and program instantaneous thresholds.
- When using an oxygen sensor, to program the *minimum* and *maximum* alarm thresholds or 2 *minimum* thresholds if this option was selected.
- When using a toxic gas sensor, to program instantaneous thresholds.
- When using a catharometric sensor, to program low instantaneous thresholds.

The coefficients are given for information in relation to CH_4 with an LEL of 5.0% volume, and are automatically used by the monitor during calibration or when changing the reference gas. If the explosive gas to be detected is not in this list, you can use the *Other* window by selecting a coefficient provided by OLDHAM (contact us).

Gas	Molecular formula	LEL [1]	LSE [2]	Vapor density	Coef. / CH_4.	Suggested gas calibr.	Abbreviation (French)
Ethyl acetate	$C_4H_8O_2$	2.1 %	11.5 %	3.0	1.35	But/Prop	AET
Acetone	C_3H_6O	2.15 %	13 %	2.1	1.55	But/Prop	ACO
Acetylene	C_2H_2	1.5 %	100 %	0.9	1.1	But/Prop	ACY
Butadiene	C_4H_6	1.4 %	16.3 %	1.85	1.25	But/Prop	BUD
Butane	C_4H_{10}	1.5 %	8.5 %	2.0	1.6	But/Prop	BUT
Butanone	C_4H_8O	1.8 %	11.5 %	2.5	1.75	But/Prop	BUN
Dimethylether	C_2H_6O	3.0 %	27.0 %	1.6	1.55	But/Prop	DIM
Unleaded petrol	Mixture	1.1 %	~ 6 %	3 to 4	3.0	But/Prop	ESS
Ethanol	C_2H_6O	3.3 %	19.0 %	1.6	1.15	But/Prop	ETA
Ethylene	C_2H_4	2.7 %	34.0 %	0.98	1.0	But/Prop	ETY
G.P.L.	Prop+But	1.65 %	~ 9.0 %	1.85	2.05	But/Prop	GPL
Diesel	Mixture	0.6 %	~ 6.0 %	> 4	5.00	But/Prop	GSL
Natural gas	CH4	5.0 %	15.0 %	0.55	1.05	CH4	GNT
Hexane	C6H14	1.2 %	7.4 %	3.0	2.36	But/Prop	HEX
Hydrogen	H2	4.0 %	75.6 %	0.069	0.80	But/Prop	H2
Isobutane	C4H10	1.5 %	~ 15 %	2.0	1.6	But/Prop	ISB
Isopropanol	C3H8O	2.15 %	13.5 %	2.1	1.6	But/Prop	ISP
Methane[3]	CH4	5.0 % 4.4 %	15.0%	0.55	1.00 1.14	CH4	CH4
Methanol	CH3OH	5.5 %	44.0 %	1.1	1.0	But/Prop	MTL
Methylamine	CH3NH2	4.9 %	20.7 %	1.1	2.0	CH4	MAM
Propylene oxide	C_3H_6O	2.3 %	37.0 %	2.0	2.0	But/Prop	OPR
Ethylene oxide	C_2H_4O	2.6 %	100 %	1.5	2.1	But/Prop	ETO
Pentane	C_5H_{12}	1.4 %	8.0 %	2.5	1.70	But/Prop	PNT
Propane	C_3H_8	2.0 %	9.5 %	1.6	1.3	But/Prop	PRO
Propylene	C_3H_6	2.0 %	11.7 %	1.5	1.2	But/Prop	PRY
Toluene	C_7H_8	1.2 %	7.0 %	3.1	2.05	But/Prop	TOL
White spirit	Mixture	1.1 %	6.5 %	> 2	5.0	But/Prop	WSP
Xylene	C_8H_{10}	1.0 %	7.6 %	3.7	2.5	But/Prop	XYL

List of pre-programmed combustible gases and coefficients

(1) Lower flammable limit. (2) Upper flammable limit.

(3) The LEL adopted value for methane varies by country. The monitor integrates two different CH4 ranges (LEL = 4.4% and LEL = 5.0%).

Sensor calibration menu

For calibrating the monitor sensors. Calibration consists of a zero adjustment in clean air (free from gas that could be detected by the gas monitor), as well as a sensitivity adjustment using standard gas with a concentration between 15% and 100% of the measurement range. Flow rate of the standard gas must be 60 l/h.

Auto-adjustment menu

For automatic adjustment and simultaneous *zero* setting for each sensor used on the monitor.

Date and time management menu

This menu is used to update the internal calendar and clock of the gas monitor. These data are used to define time scales, especially when the measurements stored in memory (min., max., STEL and TWA) are printed out or downloaded to a microcomputer.

Loss of date and time

The electronic circuits for the date and time are powered by an independent lithium battery (see paragraph *Memory storage battery*on page 16) when the main battery is drained or when the monitor is turned off. This lithium battery has an estimated service life of 2 years.

When this battery is low, the user is notified with a *Battery fault* message before losing all stored data. The battery must then be replaced.

This operation should only be performed by OLDHAM or OLDHAM approved personnel.

Radio communication menu

This menu allows the user to:

- Activate or deactivate radio mode.
- Select the type of radio transmission (between monitors or to a central monitor).
- Configure the monitor address.
- Select a network for the monitor.

MAC List menu

Used for wireless radio communication, this menu displays:

- The monitor's MAC address.
- MAC addresses for monitors in the same network.
- The alarm or fault status of each monitor in the network.

Exit menu

Return to normal mode.

Chapter 6 | *COM 2100* software

Subject

This password-protected software is used to supervise and maintain the gas monitor with the following applications:

- Clear display of measurements and channel settings.
- Help with diagnostics in cause of failure.
- Programming the device and sensor channels.
- Management of options.
- Calibration of channels through an automated scrolling menu.
- Publishing status and monitoring reports.
- Management, display and printout of events and measurements stored.
- Password protected.

The gas monitor can be connected to a computer non-intrusively through the infrared communication port (ref. 1) available on the monitor, using a SUB9D or USB connection cable (ref. 2) and a infrared emitter and monitor (ref. 3) plugged into the appropriate connector (ref. 1) on the device.

Figure 39: the infrared connection system and welcome screen.

Gas monitor connection

Once the *COM 2100* software has started up, the gas monitor will connect automatically. The screen will appear as seen opposite.

Follow the steps below:

- Program necessary communication parameters (port, speed, language).
- Click the *Connect* button.

Figure 40: the parameter programming menu.

Maintenance menu

Follow the steps below:

- From the menu bar, access the *Maintenance* menu.

The options are:

- *Programming*: see page 55.
- *Calibration*: see page 56.
- *Update*: see page 57.
- *Monitoring report*: see page 57.
- *Status report*: see page 57.

Figure 41: *Maintenance* menu.

Programming Menu

Follow the steps below:

- From the *Maintenance* menu (Figure 41), select *Programming*.
- The window below will be displayed.

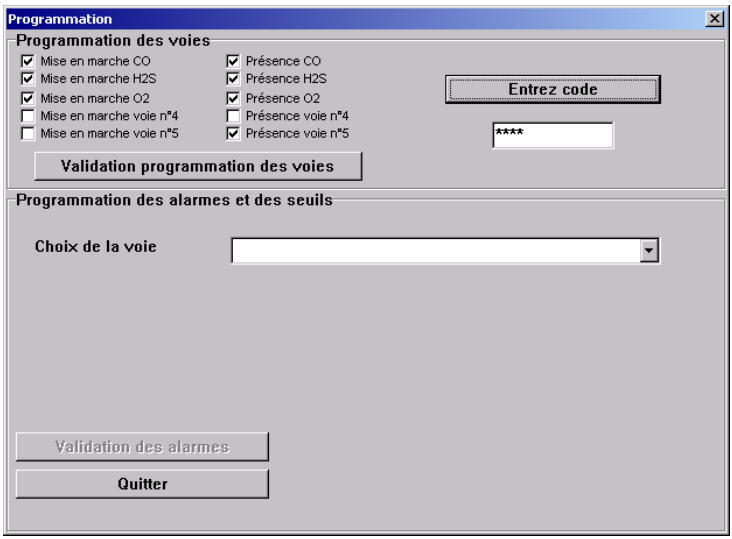


Figure 42 the channel programming window.

Channel programming

- Access authorized by code. The default code is *1000* (to change this code, see paragraph *Screen menu* on page 60).
- The first column, *Activated* (top left) allows the user to activate or deactivate measurement channels The second column *Present* allows the user to display, or not display a sensor when it is deactivated (for example O_2 *OFF* or a blank screen).

- Click on the *Confirm channel programming button*.

Programming the alarms and thresholds

In the scroll-down list *Channel options* (Figure 42):

- Modify alarm threshold values
- Confirm by clicking the *Alarm validation* button.

Programming combustible gas

- Access authorized by code. In the scroll-down list *Channel options* (Figure 42): select *Combustible gas*.
- Change the combustible gas if necessary:
  - Choose another gas from the list and click on *Programming explosive gas*.
  - Click *Exit*.

Figure 43: programming combustible gas.

Calibration menu

- From the *Maintenance* menu (Figure 41), select *Calibration*.
- Choose the sensor to calibrate.
- If necessary, set the maintenance interval.
- Indicate the level of standard gas used.
- Adjust the zero according to software instructions.
- Adjust the sensitivity. Remember to indicate the standard gas level to be injected

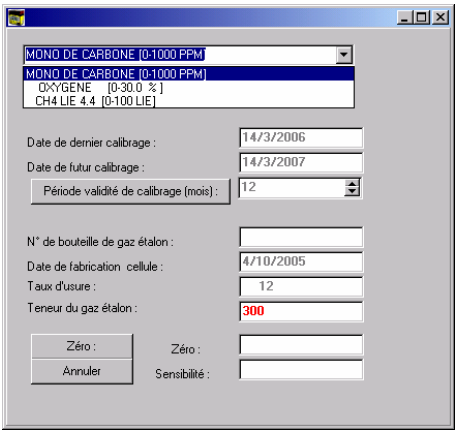


Figure 44: *Calibration* menu.

The two messages seen opposite will appear. If the messages do not appear, repeat the steps detailed in this paragraph.

Figure 45: confirming *Calibration*.

Oldham recommends using pure gases: using a mixture of standard gases can alter the precision of measurements due to interference between the detection sensors.

The standard gas concentration should be between 15% and 100% of the measurement range.

The *Update the BM25 date and time from a PC* menu

You can update the gas monitor clock directly to match the PC clock. Follow the steps below:

- From the *Maintenance* menu (Figure 41), select the option *Update the BM25 date and time from a PC*.
- Click on *OK* once the update has occurred.

Figure 46: the *Update* menu.

The *Monitoring Report* menu

Follow the steps below:

- From the *Maintenance* menu (Figure 41), select *Monitoring Report*.
- Fill in the fields (user's information for instance)
- Create the monitoring report (.ctr file)
- From the PC (*COM 2100* files) open this file to view or print.

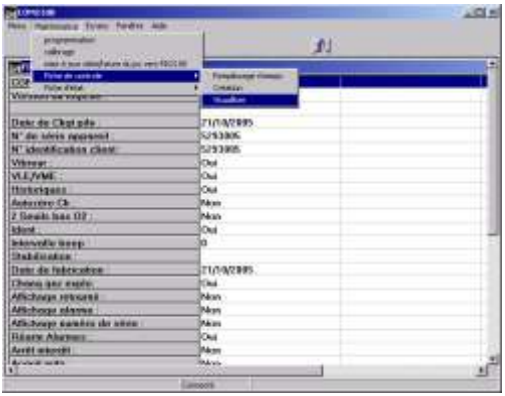
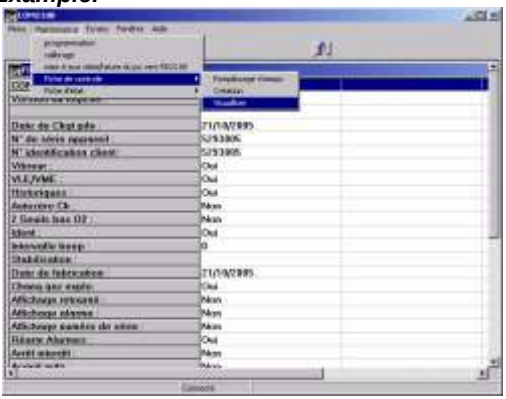


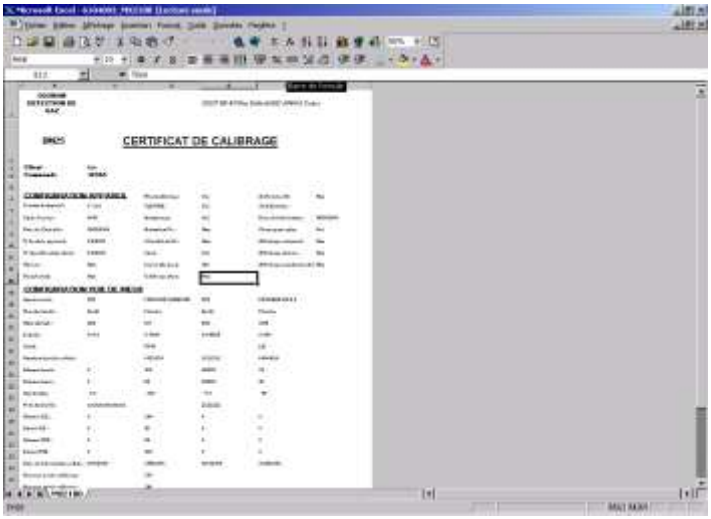
Figure 47: the *Monitoring Report* menu.

Example:



Step 1

Step 2 and 3



Step 4

The *Status Report* menu

Follow the same steps described in the *Monitoring Report menu* (.etx files).

Alarm relay configuration and logic inputs

Once the channel is chosen using the *Programming* menu, follow these steps:

- Set the selections by clicking on the appropriate boxes (Figure 48) for alarm relays and logic inputs.

  Reference 1
  Column for programming alarm relay activation.

  Reference 2
  Column for programming logic inputs.

  Reference 3
  Logic inputs for alarms.
  - *Alarm relays*: for activation of internal alarm relay by an external alarm.
  - *Alarm 1*: slow speed visual indicator.
  - *Alarm 2*: rapid speed visual indicator.
  - *Transferred alarm*: very slow speed visual indicator.

  Reference 4
  Logic input for acknowledgment
  - *Local acknowledgment*: manually acknowledgment of a remote alarm from the gas monitor keyboard.
  - *Remote acknowledgment*: acknowledgment of a gas monitor alarm using a remote button (closing of contact).

- Click the *OK* button to confirm.

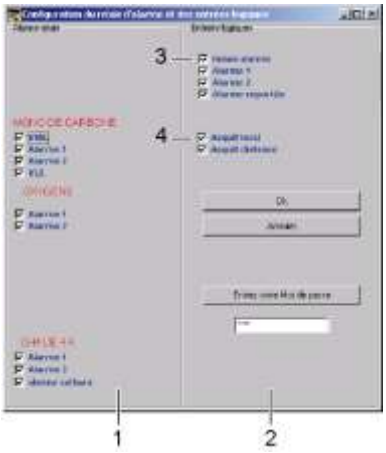


Figure 48: the alarm relay and logic operations configuration window.

Screen menu

This menu displays the history, faults, measurements and configuration of the device upon delivery. The maintenance access code for the monitor (0018 default) and software access code (1000 default) can also be modified.

A roundsman list can be created for further use by operators. This provides histograms related to a date/time and a name (location or user).

Creating a list of names:

- Write a new name in the field *Enter a new roundsman*.
- Confirm by clicking on the *Confirm the new roundsman* button. The new name will appear in the *Stored roundsman list*.
- Click on the name listed in the *Stored roundsman list*
- In the *List of roundsmen recorded in the device*, click on this icon >. You will be able to navigate within the list of names or the full list from left to right and right to left, by using the single or double arrows.
- Click on *OK* to transfer the new list to the device.

Figure 49: the roundsman name creation window.

Chapter 7 | Technical specifications

Gas monitor

Function	
Manufacturer :	OLDHAM
Function:	Multi-risk gas monitor
Type:	BM 25 and BM 25W (wireless).
Gas	
Configuration:	One to four sensors (explosive, electrochemical, infrared (LEL or CO2), catharometric or PID sensors)
Gases detected:	Explosive gases, toxic gases and oxygen
Measurement:	Continuous on all sensors in operation
Sensors:	■ Intelligent, pre-calibrated, interchangeable units ■ Automatic recognition by the device through EEPROM
Switching explosive ranges:	Automatic, from *% Gas* scale to *% Volume* scale.
Display	
Display unit:	■ Graphic LCD. ■ Clear messages, with backlighting ■ *Flip-Flop* function.
Display lighting:	Timed. Upon request, automatic for alarm or fault.
Various alarms	
Operations check:	■ Self-test at start-up. ■ Visual signal every 2 minutes (factory).
Alarm thresholds:	■ Explosive: 2 adjustable instantaneous thresholds in 0-60 % LEL range. ■ Oxygen: two adjustable instantaneous thresholds over the sensor's entire measuring scale (over-oxygenation and under-oxygenation) or two optional under-oxygenation thresholds.

<table>
<tr><td></td><td>■ Toxic (per sensor): two adjustable instantaneous thresholds over the sensor's entire measuring scale (one STEL threshold and one TWA threshold).</td></tr>
<tr><td>Alarm indicators</td><td>■ Visual and auditory alarm.
■ Clearly displayed fault or alarm for the appropriate channel.</td></tr>
<tr><td>Sensor faults:</td><td>■ Indication by indicator light.
■ Clear message.
■ Corresponding display frozen. Other channels operational.
■ Continuous visual and auditory alarm.</td></tr>
<tr><td>Battery fault</td><td>■ Clear message.
■ Continuous visual and auditory alarm.</td></tr>
<tr><td colspan="2">Inputs and outputs</td></tr>
<tr><td>Inputs/Outputs (options)</td><td>■ RS232 infrared link.
■ PC maintenance and supervision software, Excel ™ database.
■ Alarm relay output.
■ Fault relay output.
■ Logic input for alarm trigger.
■ Wireless radio communication (2.4 GHz - 100 mW)</td></tr>
<tr><td colspan="2">Additional software</td></tr>
<tr><td>Additional software:</td><td>Maintenance software COM 2100.</td></tr>
<tr><td colspan="2">Power supply</td></tr>
<tr><td>Power Supply:</td><td>NiMH rechargeable battery pack.</td></tr>
<tr><td>Battery life in hours (excluding alarms and as a function of the number of sensors):</td><td>
<table>
<tr><th>Configuration</th><th>Without radio module (hours)</th><th>With radio module (hours)</th></tr>
<tr><td>1 catalytic and 2 infrared</td><td>40</td><td>35</td></tr>
<tr><td>1 catalytic and 1 infrared</td><td>70</td><td>50</td></tr>
<tr><td>1 catalytic and several Tox</td><td>100</td><td>65</td></tr>
<tr><td>Only Tox sensors</td><td>170</td><td>135</td></tr>
</table>
</td></tr>
<tr><td>Charging Time:</td><td>4.5 hours.</td></tr>
<tr><td colspan="2">Weight and dimensions</td></tr>
</table>

Weight:	6.85 kg.
Dimensions:	470 x 180 x 190 mm (H x W x D).
Certification	
Sealing:	IP66 certified by approved laboratory (INERIS).
Certifications:	■ Compliant with standard EN 50270 (Electromagnetic Compatibility). ■ Compliant with ATEX directive and to the IEC Ex Schema.

Measurement sensors

Non-exhaustive list.

Table No. 1

	Methane (CH_4)	*Methane (CH_4)*	*Methane (CH_4)*
Sensor reference	6 314 064	6 313 888	6 313 889
Standard range (1)	0 - 100% LEL CH4	0 - 100% LEL CH4	0 - 100% vol
Measurement principle	Infrared	Catalytic	Catharometric
Display resolution(1)	1 % LEL	1 % LEL	1% v/v
Accuracy (2)	2	2	2
Repeatability (3)	± 2 % LEL	± 1 % LEL	± 1% vol
Deviation of zero/sensitivity (4)	1 / 2	0.5 / 5	0.2 / 2
Response time (5) (sec)	< 30	< 20	< 20
Temperature (6)	-20°C to +55°C	-20°C to +50°C	-20°C to +50°C
Relative humidity and pressure range (7)	■ 0 – 99 % RH ■ 1 bar ± 10 %	■ 0 – 95 % RH ■ 1 bar ± 20 %	■ 0 – 95 % RH ■ 1 bar ± 20 %
Service life (8)	> 60 months	48 months	60 months
Storage conditions and maximum storage time (9)	■ 4°C to +20 °C ■ 10-60 % RH ■ 1 bar ± 10 % ■ 6 months maximum	■ -40°C to +40 °C ■ 10-60 % RH ■ 1 bar ± 10 % ■ 6 months maximum	■ -40°C to +40 °C ■ 10-60 % RH ■ 1 bar ± 10 % ■ 6 months maximum
Response time (10)	300 s	30 s	30 s
Notes	Hydrogen cannot be detected with IR sensor.	■ Measurement is underestimated if oxygen level is < 10 %. ■ Exposure to high levels of silicon or sulfur vapors may damage the sensor. ■ The monitor is sensitive to the majority of explosive gases.	

Table No. 2

	Propane (C_3H_8)	*Oxygen (O_2) 2 years*	*Oxygen (O_2) 1 year*
Sensor reference	6 313 888	6 313 780	6 313 817
Standard range (1)	0 - 100% LEL C3H8	2 - 30 % volume	2 – 30 % volume
Measurement principle	Catalytic	Electrochemical	Electrochemical
Display resolution(1)	1 % LEL	0.1 % v/v	0.1 % v/v
Accuracy (2)	2	0.3 % v/v	0.3 % v/v
Repeatability (3)	± 1 % LEL	0.1 % v/v	0.1 % v/v
Deviation of zero/sensitivity (4)	0.5 / 5	0.2 / 2	0.2 / 2
Response time (5) (sec)	< 25	< 10	< 10
Temperature (6)	-20°C to +50°C	-20°C to +40°C	-20°C to +40°C
Relative humidity and pressure range (7)	■ 0 – 95 % RH ■ 1 bar ± 20 %	■ 10 – 95 % RH ■ 1 bar ± 20 %	■ 10 – 95 % RH 1 bar ± 20 %
Service life (8)	48 months	28 months	16 months
Storage conditions and maximum storage time (9)	■ -40°C to +40 °C ■ 10-60 % RH ■ 1 bar ± 10 % ■ 6 months maximum	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 3 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 3 months
Response time (10)	30 s	Sensors functional immediately after device start up	
Notes	■ Measurement is underestimated if oxygen level is < 10 % ■ High levels of silicon or sulfur vapors may damage the monitor. ■ The monitor is sensitive to the majority of explosive gases.	■ Presence of high levels of CO_2 can lead to an over estimation of O_2 concentration.	

Table no. 3

	Carbon dioxide (CO_2)	*Carbon Monoxide (CO)*	*Hydrogen sulfide (H_2S)*
Sensor reference	6 313 818	6 313 787	6 313 788
Standard range (1)	0 - 5 % v/v	1000	100
Measurement principle	Absorption Infrared	Electrochemical	Electrochemical
Display resolution(1)	0.1 % v/v	1	1
Accuracy (2)	0.2 % v/v	15	3
Repeatability (3)	0.1 % v/v	1	1
Deviation of zero/sensitivity (4)	0.2 / 2	0.5 / 1.5	0.5 / 2.5
Response time (5) (sec)	< 30	< 30	< 25
Temperature (6)	-10°C to +40°C	-20°C to +40°C	-20°C to +40°C
Relative humidity and pressure range (7)	■ 10 – 95 % RH ■ bar ± 20 %	■ 10 – 95 % RH ■ 1 bar ± 20 %	■ 10 – 95 % RH ■ 1 bar ± 20 %
Service life (8)	60 months	36 months	36 months
Storage conditions and maximum storage time (9)	■ 0 – 40 °C ■ 10 – 60 % RH ■ 1 bar ± 20 % ■ 6 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months
Response time (10)	120 s	Sensor functional immediately after device start up	
Notes		■ Exposure to high levels of organic solvents can damage the sensors. ■ Exposure to gases at levels higher than the monitor's range can damage the device. Recalibrate sensors if they go out of range.	

Table No. 4

	Chlorine (Cl_2)	*Hydrochloric acid (HCl)*	*Hydrogen cyanide (HCN)*
Sensor reference	6 313 809	6 313 804	6 313 805
Standard range (1)	10	30	10
Measurement principle	Electrochemical	Electrochemical	Electrochemical
Display resolution(1)	0.1	0.1	0.1
Accuracy (2)	0.25	1	0.25
Repeatability (3)	2	2	2
Deviation of zero/sensitivity (4)	0.5 / 5	0.5 / 5	0.5 / 5
Response time (5) (sec)	< 60	< 80	< 60
Temperature (6)	-20 to +40	-20 to +40	-20 to +40
Relative humidity and pressure range (7)	■ 10 – 90 % RH ■ bar ± 20 %	■ 15 – 95 % RH ■ 1 bar ± 20 %	■ 15 – 95 % RH ■ 1 bar ± 20 %
Service life (8)	30	24	24
Storage conditions and maximum storage time (9)	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months
Response time (10)	Sensor functional immediately after device start up		
Notes	■ Exposure to high levels of organic solvents can damage the sensors. ■ Exposure to gases at levels higher than the monitor's range can damage the device. Recalibrate sensors if they go out of range.		

Table no. 5

	Ammonia (NH_3)	*Ammonia (NH_3)*	*Nitrogen oxide (NO)*
Sensor reference	6 313 799	6 313 800	6 313 802
Standard range (1)	100	1000	300
Measurement principle	Electrochemical	Electrochemical	Electrochemical
Display resolution(1)	1	1	1
Accuracy (2)	5	30	10
Repeatability (3)	2	2	1
Deviation of zero/sensitivity (4)	1 / 2	1 / 2	0.5 / 3
Response time (5) (sec)	< 90	< 90	< 30
Temperature (6)	-20 to +40	-20 to +40	-15 to +40
Relative humidity and pressure range (7)	■ 10 – 90 % RH ■ bar ± 20 %	■ 15 – 95 % RH ■ 1 bar ± 20 %	■ 15 – 95 % RH ■ 1 bar ± 20 %
Service life (8)	30	24	30
Storage conditions and maximum storage time (9)	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months
Response time (10)	Sensor functional immediately after device start up		
Notes	■ Exposure to high levels of organic solvents can damage the sensors. ■ Exposure to gases at levels higher than the monitor's range can damage the device. Recalibrate sensors if they go out of range.		

Table No. 6

	Nitrogen dioxide (NO_2)	*Sulfur dioxide (SO_2)*
Sensor reference	6 313 801	6 313 819
Standard range (1)	30	30
Measurement principle	Electrochemical	Electrochemical
Display resolution(1)	1	1
Accuracy (2)	1	1
Repeatability (3)	1	1
Deviation of zero/sensitivity (4)	0.5 / 5	0.5 / 2
Response time (5) (sec)	< 30	< 60
Temperature (6)	-20 to +40	-20 to +50
Relative humidity and pressure range (7)	■ 10 – 90 % RH ■ bar ± 20 %	■ 15 – 95 % RH ■ 1 bar ± 20 %
Service life (8)	30	24
Storage conditions and maximum storage time (9)	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months	■ 4 – 20 °C ■ 10 – 60 % RH ■ 1 bar ± 10 % ■ 2 months
Response time (10)	Sensor functional immediately after device start up	
Notes	■ Exposure to high levels of organic solvents can damage the sensors. ■ Exposure to gases at levels higher than the monitor's range can damage the device. Recalibrate sensors if they go out of range.	

1. In ppm unless otherwise specified.
2. At 50% of scale (same unit as range).
3. As % of signal read unless otherwise specified.
4. Nominative values in normal use conditions per month as % of scale for zero and as % of measurement for sensitivity.
5. In seconds at 90% of final value.
6. In °C.
7. Without condensation.
8. Observed average per month. 12-month guarantee.
9. All sensors must be protected from air when stored.
10. Time from device start-up for optimal performance of sensor.

Chapter 8 | Accessories and spare parts

Accessories

Reference	Description
6511154	Universal charger 110/220 VAC for BM 25 / Charging time 4.5hrs.
6511164	Vehicle charger 12/30 VDC for BM 25.
WCHMUBM	Wall charger for BM 25.
6321390	Support for BM 25 wall charger.
WLOG210	COM 2100 software kit with infrared/COM cable.
WLOGUSB	COM 2100 software kit with infrared/USB cable.
6314588	Connection cable IR/USB.
6314583	Connection cable IR/COM.
6331159	Gas calibration and (manual) sampling pipe.
6327920	Sampling kit with rigid pump rod.
6327919	Sampling kit with semi-rigid pump rod (not for use in hazardous areas).
6327918	Sampling kit with telescopic pump rod.
6327921	Manual sampling kit with crystal tube (4 m).
6327922	Manual sampling kit with telescopic rod.
6327923	Manual sampling kit with semi-rigid rod (not for use in hazardous areas).
6327924	Manual sampling kit with rigid rod.
6321388	Tripod.
	Trickle charge kit
6311085	Single, 25 m in length.
6311089	Single, 50 m in length.

Reference	Description
6311093	Single, 100 m in length.
6311094	Double, 25 m in length.
6311095	Double, 50 m in length.
6311096	Double, 100 m in length.
	Alarm transfer
6315862	Alarm transfer kit. Length 25 m.
6315863	Alarm transfer kit. Length 50 m.
6315864	Alarm transfer kit. Length 100 m.

Parts

Reference	EXPLO sensors
6313888	EXPLO sensor, 0-100% LEL
6313889	EXPLO CATHARO sensor, range 0-100% LEL and 5-100% vol CH_4 for BM 25 only (H_2 version also available).
	MEDIUM sensors
6313780	O2 sensor (medium type) (lifetime 2 years).
6313823	COMBI CO / H_2S sensor.
6313818	CO_2 sensor 0-5% vol.
6313857	NO_2 sensor 0-30 ppm.
6313843	Cl_2 sensor 0-10 ppm.
6313821	ETO sensor 0-30 ppm.
6313819	SO_2 sensor 0-30 ppm.
6313822	SO_2 sensor 0-100 ppm.
6313841	ClO_2 sensor 0-3 ppm.
	MINI TOX / O2 sensors
6313817	O_2 sensor (lifetime 1 year minimum).
6313787	CO sensor 0-1000 ppm.
6313826	CO sensor 0-2000 ppm.
6313788	H_2S sensor 0-100 ppm.
6313816	H_2S sensor 0-30 ppm (special for hydrocarbons).
6313799	NH_3 sensor 0-100 ppm.

6313800	NH_3 sensor 0-1000 ppm.
6313801	NO_2 sensor 0-30 ppm.
6313802	NO sensor 0-300 ppm.
6313803	H_2 sensor – 0-2000 ppm.
6313804	HCl sensor 0-30.0 ppm.
6313805	HCN sensor 0-30.0 ppm.
6313806	HF sensor 0-10 ppm.
6313807	O_3 sensor (Ozone) 0-1 ppm.
6313808	SIH_4 sensor (Silane) 0-50 ppm.
6313809	Cl_2 sensor 0-10.0 ppm.
6313810	PH_3 sensor (Phosphine) 0-1 ppm.
6313811	AsH_3 sensor (Arsine) 0-1 ppm.
6313812	$COCl_2$ sensor (phosgene) 0-1 ppm.
6313820	F_2 sensor 0-1 ppm.
6313879	N_2H_4 sensor 0-1ppm.
	Position 5
6313998	PID isobutylene sensor.
6314065	CH_4 sensor IR 0-100% LEL (4.4%vol).
6314064	CH_4 sensor IR 0-100% LEL (5.0%vol).
6314087	C_3H_8 sensor IR (0-100% LEL).
6314088	C_4H_{10} sensor IR (0-100% LEL).
6314089	Isobutane IR sensor (0-100% LEL).
6314090	LPG IR sensor, (0-100% LEL).
6314092	CH_4 IR sensor (0-100% vol).

Note: this list is not exhaustive and may be modified. Sensors must be stored in a cool place (5°C).

Reference	Accessory
6313832	Batch of blank sensors TOX/O_2/Expl.
6111303	Intrinsically secure power supply only.
6153027	Intrinsic safety power supply connector cable.

Chapter 9 | Special instructions for use in ATEX explosive atmospheres

Information in following paragraphs must be taken into account and followed by the person responsible for the equipment installation site. Refer to the provisions of European ATEX Directive 1999/92/EC or to the applicable local legislation, relevant to improving safety protection and health of workers exposed to the risks of explosive atmospheres.

The installation and maintenance of the gas monitor should be performed according to standards EN/IEC 60079-14 and EN/IEC 60079-17.

For intrinsically safe installations and especially for connections to the gas monitor, the person responsible for the intrinsic safety installation, called the *System designer*, must establish a system document demonstrating that the entire gas monitor system - Cable - Body is Intrinsically Safe (see standard IEC 60079-25 for the preparation of this document).

Essential Safety and Health requirements comply with the following standards:

ATEX	IECEx
EN 60079-0:2012	IEC 60079-0 (ed. 6), 2011
EN 60079-1:2007	IEC 60079-1 (ed. 6), 2007
EN 60079-11:2012	IEC 60079-11 (ed. 6), 2011
EN 60079-26:2007	IEC 60079-26 (ed. 2), 2007
EN 50303:2000	

ATEX areas and general rules

If the device is used in a contaminated atmosphere, the catalytic sensor must be calibrated it before its next use.

Silicon vapors or other contaminants may have an adverse effect on catalytic sensors (slot 1) for explosive gas detection, and may distort measurements (under-estimated measurements).

The gas monitor can be used in explosive atmospheres in Group II surface industries and Group I mines containing firedamp.

The ambient temperature range for use is from –20° C to + 55° C.

Depending on the type of sensors used on the device, categories covered by the gas monitor are:

a) Device equipped with any type of sensor block except infrared block.

- Surface industries: Category 1G, use in zones 0, 1 or 2.
- Mines containing firedamp: Category M1, use for any gas value.

b) Device equipped with any type of sensor block <u>including</u> infrared block

- Surface industries: Category 2G, use in zones 1 or 2.
- Mines containing firedamp: Category M2, use below a gas limit value.

The following operations are prohibited in explosive atmospheres:

- Opening of the instrument: sensor cover or rear cover.
- Charge the batteries using a universal or vehicle charger.
- Link-up with a computer.

All servicing, adjustment and maintenance operations must be performed by duly approved personnel.

The battery pack must be replaced by the original part specified by the manufacturer.

Input/output parameters

Gas monitor recharge connector

The charger provided by OLDHAM should only be used outside of the ATEX areas. When the recharging is done by a charger other than the one provided by OLDHAM, its characteristics must not exceed a voltage of 30VDC and a current of 30 A.

Alarm output and AON logic input connectors

Input characteristics for static relay:

- U_i = 30 V max.

- I_i = 150 mA max.

Output characteristics for AON logic input:
- U_o = 5 V.
- I_o = 50 mA.
- L_o = 8 mH.
- C_o = 7 µF.

Only circuits disconnected from power should be connected to digital input, or:
- U_i = 0 V.
- I_i = 0 A.

The two previous circuits are separate intrinsic circuits. The cables connected to the ends of these circuits must comply with the requirements for intrinsically safe circuit wiring: cable type, insulation voltage, insulation, linear capacity and inductance. Refer to national and international standards, for example EN/IEC 60079-14.

A system log should be established by the person responsible for the installation as explained above.

Trickle charging connection (external power source)

The external power source for battery pack maintenance must be intrinsically safe and must be compatible with the following gas detector input characteristics:
- U_i = 30 VDC.
- I_i = 160 mA.
- C_i = 0 µF.
- L_i = 0 mH.

It is possible to connect two external power supplies on the connector in accordance with the rules specified in the previous paragraph.

References for electrical connector signals

The paragraph *Connections* on page 10 describes the gas monitor's various connections. Unused connectors must be equipped with their protective cap.

Markings:

OLDHAM
CE 0080
BM 25 (without radio communication module)
IP 66
Ambient T: -20° C +55° C

II 1G/ I M1
Ex ia IIC T4 Ga / Ex ia I Ma

With infrared sensor block
IP 66
Ambient T: -20° C +55° C

II 2G / I M2
Ex ia d IIC T4 Gb / Ex ia d I Mb

INERIS 05ATEX0044
Do not open in explosive atmospheres
serial number
manufacture year
Warning: Read the instructions carefully before starting-up. Substitution of components may compromise intrinsic safety.

OLDHAM
CE 0080
BM 25 (with radio communication module)
IP 66
Ambient T: -20° C +55° C

II 1G/ I M1
Ex ia IIB T4 Ga / Ex ia I Ma

or

II 2G / I M2
Ex ia IIC T4 Gb / Ex ia I Mb

With infrared sensor block
IP 66
Ambient T: -20° C +55° C

II 2G / I M2
Ex ia d IIC T4 Gb / Ex ia d I Mb

INERIS 05ATEX0044
Do not open in explosive atmospheres
Serial number
Manufacture year

Warning: Read the instructions carefully before starting-up. Substitution of components may compromise intrinsic safety.

Chapter 10 | Certificate of Compliance

The document hereafter (2 pages) reproduces the EC declaration of conformity.

OLDHAM

Déclaration de Conformité CE
EC Declaration of Conformity

CE

La **Société Oldham SAS**, ZI Est 62000 Arras France, atteste que la :
The ***Company*** **Oldham SAS**, *ZI Est 62000 Arras France, declares that:*

Détecteur de gaz BM 25
BM 25 Gas Detector

est conforme aux exigences des Directives Européennes suivantes:
complies with the requirements of the following European Directives:

I) Directive Européenne ATEX 94/9/CE du 23/03/94: Atmosphères Explosives
The European Directive ATEX 94/9/CE of 23/03/94: Explosive Atmospheres

Normes harmonisées appliquées : *Harmonised applied standards*	**EN 60079 -0**:12 Protection du matériel-règles générales *Equipment protection-general requirements* **EN 60079-1**:07('d') / **EN 60079-11**:12 ('i') **EN 60079-26**:07 ('Ga') / **EN 50303**:00 ('M')
Catégorie*(Category)*/Marquage*(marking)*	
Détecteur sans cellule infrarouge ***Detector without IR sensor***	
BM 25 (sans module de communication radio) *(without radio communication module)*	**II 1G / I M1** **Ex ia IIC T4 Ga / Ex ia I Ma**
BM 25W (avec module de communication radio) *(with radio communication module)*	**II 1G / I M1** **Ex ia IIB T4 Ga / Ex ia I Ma** **ou** **II 2G / I M2** **Ex ia IIC T4 Gb / Ex ia I Mb**
Détecteur avec cellule infrarouge ***Detector with IR sensor***	
BM 25 (sans module de communication radio) *(without radio communication module)*	**II 2G / I M2** **Ex ia d IIC T4 Gb / Ex ia d I Mb**
BM 25W (avec module de communication radio) *(with radio communication module)*	**II 2G / I M2** **Ex ia d IIC T4 Gb / Ex ia d I Mb**
Attestation CE de Type du matériel *EC type examination certificate*	**INERIS 05 ATEX 0044**
Notification Assurance Qualité de Production *Notification of the Production QA*	**INERIS 00 ATEX Q403**
Délivré par l'Organisme notifié numéro 0080 *Issued by the Notified Body n°0080*	**INERIS**, Parc Alata 60550 Verneuil en Halatte France

II) Directive Européenne CEM 2004/108/CE du 15/12/04 : Compatibilité Electromagnétique
The European Directive EMC 2004/108/CE of 15/12/04: ELECTROMAGNETIC COMPATIBILITY

Normes harmonisées appliquées : *Harmonized applied standards*	**EN 50270:**06 for type2 CEM-Appareils de détection des gaz *EMC- apparatus for the detection of gases*

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CE_ATEX_BM25_usIC

OLDHAM

Déclaration de Conformité CE
EC Declaration of Conformity

CE

III) Directive Européenne R&TTE 99/5/CE du 07/04/99
The European Directive R&TTE 99/5/EC of 07/04/99

Normes harmonisées appliquées :
Harmonised applied standards

EN 300 328 : 1.8.1 Compatibilité électromagnétique et spectre radioélectrique (ERM); Les systèmes de transmission à large bande; Fonctionnement de l'équipement de transmission de données dans la bande ISM à 2,4 GHz et en utilisant des techniques de modulation à bande large; EN harmonisée couvrant les exigences essentielles de l'article 3.2 de la directive R&TTE
Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

EN 62479 :2010 Evaluation de la conformité des appareils électriques et électroniques de faible puissance aux restrictions de base concernant l'exposition des personnes aux champs électromagnétiques (10 MHz à 300 GHz)
Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

Arras, le 07/04/2014

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